

**REMARKS**

With this amendment, Applicant adds claims 15 and 16. Claims 1-16 are all the claims pending in the application.

**1. Claim Rejections Under 35 U.S.C. § 103**

The Examiner has rejected claims 1-6 and 8-13 under 35 U.S.C. § 103(a) as being unpatentable over Kano (US 5,359,513) [“Kano”] in view of Jatko (“Nonlinear Filter Derived From Topological Image Features”, SPIE Vol. 1295 Real-Time Image Processing II, 1990)[“Jatko”]. For at least the followings reasons, Applicant traverses the rejection.

Claim 8 recites an apparatus for detecting suspected anomalous shadows that comprises “an image processing means for obtaining a processed difference image by subjecting said difference image to an image process wherein an actual difference between the two images on which said difference image is based is enhanced relative to artifacts appearing due to misalignment of a position of a structural element of the subject on one of the two images from a corresponding position of the structural element on the other of the two images.” The Examiner cites a section of Kano that discloses that post-processing techniques can include computer-aided diagnostics and applies Jatko to allegedly teach the claimed image processing for obtaining a processed difference image. The Examiner contends that one skilled in the art would have combined the references to remove artifacts that can be misinterpreted as flaws. Office Action at pages 3-4.

Jatko relates to a method of processing images where actual differences in printed documents are differentiated from normal variations in the printing process due to ink chemistry,

plate wear and environmental conditions (page 8, second full paragraph). As illustrated in Fig. 5d of Jatko, the artifacts appear as random fine points.

In contrast, Kano is directed to temporal subtraction of medical images. Artifacts occur due to misalignment of a subject in the images. The misalignment of the subject is due to three dimensional shifting of the subject, as illustrated in Figure 12. Accordingly, the artifacts in Kano are caused by positional mismatching among anatomical structural elements. The misalignment of the subject in the images, which are employed in the temporal subtraction process, appear as linear or planar artifacts and are different from the random fine points of Jatko.

For at least the reasons given above, Applicant submits that the artifacts disclosed in Jatko and Kano are physically different from each other. Therefore, one skilled in the art would not combine the teachings of the two references.

In addition, Jatko discloses a method for removing artifacts using morphology operations. However, in order to remove artifacts using morphology operations, it is necessary to administer the morphology operations using structural elements that correspond to the size of the artifacts to be removed.

Both the artifacts and the actual differences, due to a time interval, between the first and second images in Kano are a result of temporal subtraction. In order to remove only the artifacts, it would be necessary to administer morphology operations which are capable of removing only the artifacts based on differences in shapes and sizes of the artifacts in comparison to the actual differences. However, there is no disclosure in Kano regarding the shapes and sizes of the artifacts and the actual differences, due to the time interval, between the first and second images.

Therefore, even if a combination of the teachings were possible, the disclosure in Kano would not render obvious the modification of the system in Kano with the morphology operations as disclosed in Jatko.

Moreover, Jatko discloses that printing variations that fall within three times the standard deviation  $\sigma$ , which represents the degree of variability of the printing press, are ignored (page 10, first and second full paragraphs). There are no teachings in Jatko related to criteria that can be used to establish a standard deviation  $\sigma$  based on imprecision in the nonlinear warping match method disclosed in Kano.

Since the disclosure in Jatko relates to eliminating artifacts due to variability of the printing press, not imprecision in image processing of medical images, Applicant submits that the teachings of Jatko are irrelevant to the processing of artifacts in the subtraction image of Kano.

For example, Jatko actually seeks to ignore some degree of misregistration by de-emphasizing the detection at reference edges (page 9, second full paragraph). This de-emphasis on edge analysis teaches away from any purported reason to combine Kano and Jatko. This is because Kano seeks to analyze edges for purposes of minimizing misregistration. The attenuation of edge values in Jatko would undermine these objects.

Therefore, contrary to the Examiner's contentions, one skilled in the art would not have combined the teachings as suggested by the Examiner for at least the reasons given above, and the Examiner has failed to make a *prima facie* case of obviousness.

Because claim 1 recites features similar to those given above with respect to claim 8, Applicant submits that the Examiner has failed to make a *prima facie* case of obviousness for at least reasons similar to those given above with respect to claim 8.

Applicant submits that claims 2-6 and 9-13 are patentable at least by virtue of their respective dependencies.

In addition, claim 4 recites that “the image process is an image process that enhances the actual difference more than the artifacts.” Claim 11 recites a similar feature. Applicant submits that, at most, Kano in view of Jatko suggests that artifacts are reduced or eliminated (Fig. 2 of Jatko). Therefore, Kano in view of Jatko does not disclose or suggest that the actual difference be enhanced as set forth in claims 4 and 11.

The Examiner has rejected claims 7 and 14 under 35 U.S.C. § 103(a) as being unpatentable over Kano and Jatko in view of Doi (US 5,289,374) [“Doi”]. For at least the following reasons, Applicant traverses the rejection.

Because Doi does not cure the deficient teachings of Kano and Jatko, Applicant submits that claims 7 and 14 are patentable at least by virtue of their respective dependencies.

## **2. New Claims**

With this amendment, Applicant adds claims 15 and 16. Applicant submits that claims 15 and 16 are patentable at least by virtue of their respective dependencies, as well as the features set forth therein.

**3. Conclusion**

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

The USPTO is directed and authorized to charge all required fees, except for the Issue Fee and the Publication Fee, to Deposit Account No. 19-4880. Please also credit any overpayments to said Deposit Account.


Respectfully submitted,

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